

IN THE DRAWINGS

Please cancel sheet 5 of the drawings, as filed, which consists of Fig. 5. Please substitute replacement sheet 5, as is submitted herewith.

REMARKS

Applicants and the undersigned have carefully reviewed the first Office Action of September 03, 2004 in the subject U.S. patent application, together with the prior art cited and relied on by the Examiner in the rejection of the claims. In response, the specification, drawings, and claims of the subject application, as filed, have been amended. It is believed that the claims now pending in the subject invention are patentable over the prior art cited and relied on. Reexamination and reconsideration of the application, and allowance of the claims is respectfully requested.

The subject application discloses, and claims a high capacity, leak resistant release agent delivery system that is usable in printers. The release agent delivery system is in the form of a toner release agent application roller which is usable to apply release agent, typically silicone oil, to an outer surface of a fuser roller. The fuser roller is part of an electrostatic toner printer or a phase change ink printer. The toner release agent application roller of the present invention, as recited in currently amended claim 1, includes a roller shaft with a textile web wound on it in a plurality of layers. The textile web is wound above the shaft with a sufficient number of layers to hold the quantity of silicone oil or other release agent required by the application to which the roller will be placed.

An outer layer of the plurality of layers is directly in contact with a surface of a fuser roller when the toner release agent application roller is in use in a printer. An end of that outermost layer is secured to the next underlying one of the plurality of layers of the non-woven textile web.

The textile web is formed using greater than 55% sub-denier fibers. Such a

textile web has a high void volume per unit volume and also has a high surface area per unit volume. This results in a web with high capillary focus. As is discussed in detail in the specification of the application, such high capillary force, together with the large void volume and high surface area, provide a roller with a high release agent retention capacity. Since the amount of release agent which a roller can carry determines the frequency with which the roller must be changed, the greater the carrying capacity, the less frequently the roller has to be changed.

The non-woven textile web, which is at least 55% sub-denier, can be formed by a variety of processes, which are generally known in the industry. It can also be formed using various materials as are also generally known in the industry. The use of such sub-denier fibers to form a roller with a plurality of layers of the web results in a release agent delivery device which has unexpected results in terms of release agent carrying capacity and avoidance of release agent leakage. Both of these characteristics are very important, as is also discussed in the specification of the application. If the toner release agent application roller can only hold a small amount of release agent, or if it leaks that release agent, the roller is unacceptable. The use of the textile web of greater than 55% sub-denier fibers provides the two beneficial results of high capacity and very low leak rates.

During a review of the specification and drawings of the subject application, in the course of the preparation of the subject Amendment, a minor error in the specification, and a minor error in the drawings were noted. A typographical error has been corrected in paragraph 033. In Fig. 5, the lead line for reference numeral 52 has been extended and the arrowhead has been repositioned to denote the surface of the

fuser roller 56. Neither of these changes is believed to constitute any new matter. Their entry is respectfully requested.

In the first Office Action of September 3, 2004, claim 8 was rejected under 35 USC 112, second paragraph as being indefinite. It was asserted that the limitation "spunbond/hydroentagled" is unclear.

Claims 1-9, 11 and 12 were rejected as being anticipated by U.S. patent No. 6,449,455 to Lebold et al. It was asserted that Lebold teaches a toner release agent application roller 10 that includes the features recited in claims 1-9, 11 and 12. Claim 10 was rejected under 35 USC 103(a) as being unpatentable over Lebold et al.

In response to the first Office Action, claims 1 and 8 have been amended. Claims 2-7 and 9-12 have been carried forward. It is believed that all of the claims now pending in the subject U.S. patent application are patentable over the prior art cited and relied on by the Examiner.

With respect to the rejection of claim 8 under 35 USC 112, second paragraph, claim 8 has been amended to correct the spelling of "entangled." Claim 8 has also been amended to recite that the non-woven textile web is a spunbond/hydroentangled non-woven textile web. As its name implies, a non-woven web is a web of material that is made or formed using other than conventional weaving techniques. A spunbond web is one that is formed by the deposition of a plurality of fine filaments onto a moving surface, typically a belt. A hydroentangled web is one in which a plurality of fibers are entangled with each other by the use of high velocity jets or currents of water. Both spunbond and hydroentangled webs are generally known in the art. The combined term "spunbond/hydroentangled" refers to a specific product type which is made from the

combination of these two processes. The Evolon product from Freudenberg, which is discussed in the specification of the subject application, is a spunbond/hydroentangled product. It is believed that claim 8, as amended, is not indefinite and that it complies with 35 USC 112, second paragraph.

Turning now to the rejection of claims 1-9, 11 and 12 as being anticipated by U.S. patent No. 6,449,455, there are several fundamental differences between the subject invention and the release agent delivery system described in that patent. Claim 1 has been amended to more clearly point out those differences. However, it is believed that claim 1 as filed, is not anticipated by the '455 Lebold reference.

Both of the two devices are used to apply a release agent, such as silicone oil, to a fuser roller in a printer. Both use a non-woven web. However, the prior device uses a length of the web 16, which is unrolled from a supply roller 10, and which is passed across the fuser roller 22, before being taken up on a take up spool 12. The web 16 is unrolled from the supply roll 10 in the '455 Lebold patent and passes over the surface of the fuser roller 22 only once before being taken up on the take up spool 12. Release agent retention capability or leakage rate is not involved in the Lebold patent's device. The benefit described in that patent, by using the sub-denier fiber web, is the imparting of the toner release agent to the surface of the fuser roller 22 in a pattern with fine lines that results in a better copy.

In the subject device, as recited in claim 1, the roller is formed by the provision of a textile web wound on a roller shaft in a plurality of layers. The outermost layer of the roller is engageable with the fuser roller and imparts a release agent held in the textile web to the fuser roller. In the toner release agent application roller recited in currently

amended claim 1, the outer layer of the plurality of layers of the non-woven textile web wound on the roller shaft is continuously in contact with the fuser roller.

The prior art Lebold '455 patent was cited as showing a toner release agent application roller 10. It does not show such a roller. Instead, it shows at 10 a supply roll from which a web 16 of a toner release fabric is unwound. A supply roll is not a roller. The roll 10 in Lebold '455 is analogous to a roll of paper towels from which individual towels can be removed. The subject invention is analogous to a rotary car washing brush secured to a roller and rotating while contacting a car.

As recited in currently amended claim 1, the toner release agent application roller of the present invention has an end of its outer layer secured to the next underlying layer of the plurality of layers of the textile web wound on the roller shaft. The result is a roller that is cylindrical in shape, that has a constant shape, and in which the plurality of layers are not pulled off the roller shaft. In contrast to the prior Lebold '455 device, the roller recited in claim 1 does not have to be replaced because all of the web has been pulled off the supply roll. It will eventually be replaced because it will wear out or will use all of the release agent that is carried. However, the same outer surface of the non-woven textile web, in accordance with the present invention, will contact the surface of the fuser roller possibly during hundreds of thousands of print cycles.

The use of a textile web with greater than 55% sub-denier fibers provides two very beneficial results that are not apparent to one of skill in the art. These are the capacity to hold a large volume of release agent, and the ability to retain that release agent, without leakage. These characteristics of the toner release agent application

roller of the present invention are not disclosed, or suggested in the prior art Lebold '455 patent. As discussed above, the intent of that patent is to supply release agent to the surface of the fuser roller in a pattern with very fine lines. Such a pattern provides a better print than had previously been obtainable. In Lebold '455, the textile web 16 is pulled off the supply roll 10 and is indexed across the fuser roller 22. There is no teaching, or suggestion in the prior Lebold patent of high release agent retention capacity. Such a capacity is not a concern in the prior supply roll assembly. The web need retain only enough release agent to impart it once to the fuser roller as the web 16 is indexed from the supply roll 10 to the take-up spool 12.

The use of the non-woven textile web of greater than 55% sub-denier fibers, as recited in currently amended claim 1, to form a multi-layered roller, provides the high release agent capacity of the present invention. This capacity is very important because it determines how long the toner release agent application roller can be used. If the same roller is to be used for up to a million cycles, it needs be able to hold a suitable amount of the toner release agent. The use of a plurality of layers of the non-woven textile web of greater than 55% sub-denier fibers accomplishes that result. The roller must also not leak the release agent. A large capacity is important, but it is also important that the retention capability of the roller be such that the release agent is held in the roller and is imparted only to the fuser roller instead of leaking out. The characteristics of the textile web wound on the roller shaft in a plurality of layers, as recited in currently amended claim 1, provides this capability.

It is thus believed that currently amended claim 1 is not anticipated by the prior art Lebold '455 patent. It is further believed that Lebold '455 would not render obvious

the claimed toner release application roller. Lebold '455 is a supply roll for a single pass web. The subject invention is a supply roller for continuous contact of an outer layer of a plurality of layers of a web with a fuser roller. It would not be obvious to one of skill in the art to turn a supply roll into an application roller.

Claims 2-12 depend either directly or indirectly from believed allowable currently amended claim 1 and are also believed to be allowable. While Lebold '455 discloses the use of a web of sub-denier fibers, it does not teach or suggest the structure of the release agent application roller recited in currently amended claim 1. With respect to claim 10, the prior Lebold reference discusses the use of its disclosed fiber for the purpose of forming finer oil flow patterns on the surface of the fuser roller. These finer oil flow patterns result in improved print quality through decreased microscopic streaking. The structure of claim 1 of the subject Lebold application is not disclosed in the prior art. Thus the structure recited in claim 9 of the subject application is not something requiring only routine skill in the art. The teachings in Lebold '455 of reduced microscopic streaking does not suggest the use of a type of a textile web because of its ability to provide a high release agent retention capability for the roller. Accordingly, claims 2-12 are believed to also be allowable.

The newly cited patent No. 6,609,645 to Greol has been reviewed. It was not applied against the claims of the subject invention. It is noted that this patent is directed to a roller bearing that supports a tape. It has essentially no relevance to the subject application. No further discussion of this document is required.

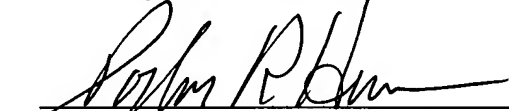
SUMMARY

The specification and drawings of the subject invention have been amended to correct minor errors. Claims 1 and 8 have been amended. Claims 2-7 and 9-12 have been carried forward. It is believed that the claims now pending in the application are patentable over the prior art reference cited and relied on. Allowance of the claims, and passage of the application to issue is respectfully requested.

Respectfully submitted,

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A handwritten signature in dark ink, appearing to read 'Douglas R. Hanscom', is written over a horizontal line.

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